

SEL Table of Contents

Section Number	Category	Title	Page Number
Foreword			94
01	Personal Protective Equipment		97
01	AR	Respiratory Protection Equipment	111
01	CB	NFPA 1994 CBRN Terrorism Protective Ensembles	123
01	EM	NFPA 1999 Protective Clothing (Emergency Medical Services)	127
01	LE	Tactical Law Enforcement Protective Equipment	131
01	PC	NFPA 1971 Ensembles (Proximity Fire Fighting with Optional CBRN Protection)	133
01	PF	NFPA 1971 Ensembles (Proximity Fire Fighting)	135
01	SC	NFPA 1971 Ensembles (Structural Fire Fighting with Optional CBRN Protection)	139
01	SF	NFPA 1971 Ensembles (Structural Fire Fighting)	141
01	SP	NFPA 1992 Splash-Protective Ensembles and Items	147
01	UC	NFPA 1951 CBRN Technical Rescue Protective Ensemble	152
01	UR	NFPA 1951 Rescue and Recovery Technical Rescue Protective Ensemble	153
01	UT	NFPA 1951 Utility Technical Rescue Protective Ensemble	159
01	VF	NFPA 1991 Ensembles with Optional Flash Fire Protection	164
01	VT	NFPA 1991 Ensembles	168
01	WA	Water Operations PPE	171
01	ZA	PPE Accessories	188
01	ZP	Ancillary Equipment	195
02	Explosive Device Mitigation and Remediation Equipment		197
02	EX	Equipment	199
02	PE	Protective Ensembles	203
03	CBRNE Operational and Search & Rescue Equipment		207
03	OE	Operational Equipment	209
03	SR	Search & Rescue Equipment	220
03	WA	Water Operational & Search/Rescue Equipment	225
04	Information Technology		230
04	AP	Application Systems and Software	232
04	HW	Hardware	238
04	MD	Media Devices	244
04	SN	Sensor Devices	246
04	SW	System and Networking Software	247

Section Number	Category	Title	Page Number
05	Cyber Security Enhancement Equipment		250
05	AU	Authentication Devices	256
05	EN	Encryption	256
05	HS	Host Level Security	257
05	NP	Network Level Security	259
05	PM	Patch and Configuration Management	260
06	Interoperable Communications Equipment		261
06	CC	Commercial	263
06	CP	Private	267
07	Detection		274
07	BD	Biological Detection	277
07	BS	Biological Support	278
07	CD	Chemical Detection	279
07	CS	Chemical Support	288
07	ED	Explosive Detection	288
07	RD	Radiological Detection	290
07	RS	Radiological Support	293
07	SE	Support Equipment	293
08	Decontamination		295
08	D1	Individual Decontamination	297
08	D2	Active Decontamination	297
08	D3	Post-Decontamination	302
09	Medical		304
09	ME	Medical Equipment	308
09	MS	Medical Supplies	319
09	PH	Pharmaceuticals	330
09	TR	Training	345
10	Power		347
10	BC	Batteries and Power Cells	348
10	GE	Generators	348
10	PE	Other Power-Related Equipment	349

SEL Table of Contents

Section Number	Category	Title	Page Number
11	CBRNE Reference Materials		351
11	FR	Field Expedient References	352
11	RD	Reference Databases	359
11	RE	References	361
12	CBRNE Incident Response Vehicles		368
12	TR	Trailers	369
12	VE	Vehicles	369
13	Terrorism Incident Prevention Equipment		372
13	IT	Information Technology	373
13	LE	Law Enforcement Equipment	374
14	Physical Security Enhancement Equipment		375
14	EX	Explosion Protection	376
14	SW	Surveillance, Warning, Access/Intrusion Control	376
15	Inspection and Screening Systems		381
15	IN	Inspection Systems	382
15	SC	Screening Systems	382
16	Reserved		383
17	CBRNE Prevention and Response Watercraft		384
17	WC	Watercraft	385
18	CBRNE Aviation Equipment		387
18	AC	Aircraft	388
19	CBRNE Logistical Support Equipment		390
19	GN	General	391
19	MH	Material Handling Equipment	394
19	SS	Shelter Systems	396

Section Number	Category	Title	Page Number
20		Intervention Equipment	397
20	FP	Fingerprint Processing and Identification	398
20	TE	Tactical Entry Equipment	398
21		Other Authorized Equipment	399
21	GN	General	400
		Standards List	401

Section 7 - Detection

Overview

This section is structured to show detection equipment and recommended technologies based on both the type of expected hazard (Chemical, Biological, Radiological, Explosive) and the anticipated mode of use (Portable, Transportable Lab Equipment, Fixed Site, and Standoff). The description of each item of detection equipment also includes an annotation on capability. It is shown as the “DIQ-Code”, and contains one or more of three codes: D for Detect, I for Identify, and Q for Quantify.

The maturity and types of detection technology vary greatly depending on the level and type of hazard the user is detecting, and therefore the number and sophistication of the detection devices also varies greatly. Radiological detection devices have been commercially available and widely used for decades. Though the military has been using them since World War I, chemical detection devices (especially for traditional chemical warfare agents) have only recently been available to the civilian community. There are numerous types of chemical detection technologies, each of which has different characteristics and operating parameters. Biological warfare agent detection devices have only recently become commercially available, and new technologies continue to emerge.

The Detection and Decontamination (D&D) SubGroup is working to incorporate applicable testing standards and certifications as they become available and approved for all types of detection devices. The SubGroup is also working with the IAB’s Training SubGroup to align the training ratings used in this section with training standards and requirements.

Finally, the SubGroup strongly recommends that a minimum of two different but complementary detection technologies (e.g., infrared, acoustic wave, etc.) be used to validate readings rather than relying upon any single instrument. This procedure will assist responders in interpreting data to better conduct their risk assessment and incident action plan.

Changes for 2007

Overall, the changes in this section for 2007 are minimal. In addition to minor edits, the team separated the item for portable Raman infrared chemical detectors into two items: one for Raman, and another for Fourier/Raman. This was motivated in part by the desire to communicate the price range difference between the two technologies.

As part of the last phase of alignment between the SEL and the DHS Authorized Equipment List (AEL), the D&D SubGroup also agreed to move Portal Monitors from Section 7 into a new Section 15, Inspection and Screening Systems. Section 15 groups several items that are likely to be used in personnel and package screening, as opposed to field operations.

Sub-Section Headings for 2007

This section structure is organized around likely modes of use. The major groupings are Chemical Detection and Support, Biological Detection and Support, Explosive Detection, Radiological Detection and Support, and Support Equipment. Within these categories, the subcategories used are:

- *Portable*, defined as being human portable for mobile operations in the field. The instrument is light enough to be carried or worn by an emergency responder and operated by one individual.
- *Transportable Lab Equipment*, defined as being human portable for mobile operations in the field but generally requires a trained technical operator as well as extensive labor.

- *Fixed-Site Sampling or Detection Systems*, defined as stand-alone detection systems specifically designed to operate inside a building, fixed-mounted to a vehicle, or set up in a fixed location to monitor an incident perimeter.
- *Standoff Detector Systems*, defined as equipment specifically designed to monitor the presence of chemical/biological agents that may be present in the atmosphere up to three miles away. These systems typically require one or two individuals for monitoring operations. Depending on the technique employed and the environmental conditions, these detectors can have high or low selectivity. Standoff detectors usually require vehicle transport and special setup.

This section of the SEL also has a unique feature within the Operating Considerations field to assist users in determining anticipated costs and training time required for each type of equipment. Rating scales were adopted by the Detection and Decontamination SubGroup to quantify initial equipment costs, recurring operation and maintenance (O&M) costs, and amount of training required to become and remain proficient in the operation of the equipment. *Note: rating scales are used to give a general indication as to the time and costs associated with each type of equipment, and should not be used as the sole determinant in equipment selection.*

The initial cost was based on the estimated average cost of equipment that fit the category, including all necessary (but not extra) components. The O&M costs and training hours were based on estimated average annual requirements. The following scales were set:

Cost Scale (used for initial cost and yearly maintenance costs)

<\$1K	\$
\$1-10K	\$\$
\$10-50K	\$\$\$
\$50-100K	\$\$\$\$
>\$100K	\$\$\$\$\$

Training Scale (yearly requirement including initial training)

< 1 day	Minimal
1-2 days	Moderate
> 2 days (or requiring knowledge of chemistry, radiation, explosives or biology, or recurring training more than once a month)	Extensive

Online Selection Factors

Like most sections in the 2007 SEL, the online¹ version of the Detection Section uses a pair of selection factors to assist users in quickly identifying appropriate equipment items. For the Detection Section, the SubGroup chose to use Proficiency Level and Hazard Environment (described below) as the two factors. Every online item is “tagged” for each appropriate combination of factors. Thus, users on the online version can choose any combination of Proficiency Level and Hazard Environment, and the system will provide a list of all items tagged for that combination.

Proficiency Level is the first factor. In addition to any specific training required to operate an individual piece of equipment, the equipment operator must possess the skills necessary to meet the recommended proficiency level. The considerations in determining this level include the anticipated location of operation (i.e. hot zone, warm zone, or cold zone), the complexity of the equipment, and the necessity for chemical or biological training or expertise. Proficiency Levels have been defined in accordance

¹ The online version of the SEL is available on the Responder Knowledge Base at www.rkb.mipt.org.

with NFPA 472, *Standard for Professional Competence of Responders to Hazardous Materials Incidents*, as follows:

- **Awareness Level.** First responders at the awareness level are those persons who, in the course of their normal duties, can be the first on the scene of an emergency involving hazardous materials. First responders at the awareness level are expected to recognize the presence of hazardous materials, protect themselves, call for trained personnel, and secure the area.
- **Operational Level.** First responders at the operational level are those persons who respond to releases or potential releases of hazardous materials as part of the initial response to the incident for the purpose of protecting nearby persons, the environment, or property from the effects of the release. They should be trained to respond in a defensive fashion to control the release from a safe distance and keep it from spreading.
- **Technician Level².** Hazardous materials technicians are those persons who respond to releases or potential releases of hazardous materials for the purpose of controlling the release. Hazardous materials technicians are expected to use specialized chemical protective clothing and specialized control equipment.
- **Command Level.** The incident commander is that person responsible for all decisions relating to the management of the incident. The incident commander is in charge of the incident site.

The second selection factor is Hazard Environment, which includes the particular CBRNE hazard environment(s) for which each item is suitable. As stated earlier, for our purposes it is useful to represent the Nuclear “N” as part Thermal, part Explosive, and part Radiological. Therefore, the Hazard Environment values used for online selection are:

- Chemical
- Biological
- Radiological
- Thermal
- Explosive

² This level was modified slightly by the SubGroup for this publication. The Technician Level was changed to Technician/Specialist in the online system (the term “specialist” as used here should not be confused with the Private Sector Specialist definition in NFPA 472). A Specialist, for purposes of our matrix, was defined as an equipment operator that possessed extensive technical expertise, but did not possess emergency response HAZMAT experience or knowledge. Generally, a Specialist would be required for a piece of equipment defined as Transportable Lab Equipment.

Section 7 Detection		Description	Features/Operating Considerations	Standards ¹
Item Number/Title	BD - Biological Detection			
01 - Portable Kit, Field Assay	Field assay kit. DIQCode: [D, I]	<p>Stand alone or with assay reader.</p> <p>-----</p> <p>Test results are presumptive; confirmatory process required.</p> <p>Limited shelf life.</p> <p>Requires temperature-controlled storage.</p> <p>Strict operating procedures.</p> <p>For use with bulk material (visible) point sampling - not for environmental surveys.</p> <p>Limited number of agents.</p> <p>Time sensitive.</p> <p>ICostRating: \$</p> <p>MCostRating: \$</p> <p>Training: minimal</p> <p>Frequent refresher training required.</p>		82
07BD-01-PTST Kit, Protein Test	Protein test kit. DIQCode: [D]	<p>Handheld</p> <p>-----</p> <p>Basic screen for biologicals based on protein detection.</p> <p>Test results are presumptive; confirmatory process required.</p> <p>Non-discriminatory between live or dead cells, harmless or harmful.</p> <p>Reagents have limited shelf life.</p> <p>For use with bulk(visible) material.</p> <p>ICostRating: \$</p> <p>MCostRating: \$</p> <p>Training: minimal</p> <p>Operational competency maintenance required.</p>		

¹ Use numbers given to refer to Standards List at the end of this document.

* Item has been moved or changed in the edition.

Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards ¹
BD - Biological Detection 02 - Transportable Lab Equipment	DNA/RNA detection analysis (example: PCR, ECL).	Test results are presumptive under field conditions; confirmatory process required. Reagent quality: continuous refrigeration required, highly perishable. Proper sample preparation critical. Does not discriminate between living and dead organisms.	
BS - Biological Support 01 - Portable	Biological sampling and evidence kit. Collects samples for later analysis.	Sample collector.	
07BD-02-DNRN Analysis, DNA/RNA Detection	DIQCode: [D,I]	ICostRating: \$\$\$ MCostRating: \$\$ Training: extensive Skill competency maintenance required.	
07BS-01-KBBA Kit, Biological Sampling/evidence - Batch	Portable air sampler for biological sampling/ evidence.	Handheld. Portable. Air particulate/aerosol. Collects sample for lab and/or assay analysis.	
07BS-01-KBPA Sampler, Biological, Portable Air		Variable air flow rate. Shelf life consideration. Filter medium ICostRating: \$\$ MCostRating: \$ Training: minimal	

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* Item has been moved or changed in the edition.

Section 7 Detection		Item Number/Title	Description	Features/Operating Considerations	Standards ¹
BS - Biological Support		03 - Fixed-Site Sampling and/or Detection Systems	Biological sampling/ evidence kit - automated perimeter sampling systems. Kit, Biological Sampling/evidence - Automated Perimeter Sampling Systems	Building system mounted. Vehicle mounted/carried. Collects/concentrates air particulates/aerosols only. Deposits sample on filters or collection medium. Does not differentiate particle type. Variable air flow rate. Filter medium ICostRating: \$\$\$ MCostRating: \$ Training: minimal	
CD - Chemical Detection		01 - Portable	Waste water classifier strips, pH and chemical. DIQCode: [D]	Easy to use. Paper indicator. Consider shelf life. ICostRating: \$ MCostRating: N/A Training: minimal	
07CD-01-CLAS		Strips, Classifier (pH, Waste Water, Chemical)	Flame ionization detector (FID) for point detection of volatile organic com- pounds (VOC). DIQCode: [D]	Handheld. Non-specific. Presence/absence. Combustible fuel source (transportation may be an issue). Caution must be used when operating in explosive atmospheres. ICostRating: \$\$ →	
07BS-03-KBAP					

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Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards ¹
CD - Chemical Detection 01 - Portable - <i>Continued</i>			
07CD-01-DPFP	Flame photometry detector for point chemical agent detection. DIQCode: [D,I,Q]	MCostRating: \$ Training: minimal	
07CD-01-DPFR*	Fourier/Raman Infrared (IR) detector for point chemical agent detection. Includes Fourier Transform Infrared (FT-IR) and FT-IR/Raman devices. DIQCode: [D,I,Q]	Detects nerve and blister. Prone to false positives (anything containing sulphur and phosphorus). Requires hydrogen fuel (expensive to ship, buy in bulk to reduce cost). ICostRating: \$\$ MCostRating: \$\$\$ Training: minimal	
07CD-01-DPIR*	Raman Infrared (IR) detector for point chemical agent detection. DIQCode: [D,I,Q]	Detects liquid, vapor and solid samples. Visible sample size needed for liquid/solid samples. Additional expense in purchasing libraries. Unstable at low temperatures. Spectral interpretation necessary. ICostRating: \$\$\$\$ MCostRating: \$ Training: extensive	

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Section 7 Detection		Item Number/Title	Description	Features/Operating Considerations	Standards ¹
CD - Chemical Detection					
01 - Portable - <i>Continued</i>				Training: extensive	
07CD-01-DPMG Detector, Multi-sensor Meter, Point, Chemical	Multi-sensor meter with minimum of O ₂ and LEL for point chemical detection. DIQCode: [D,I,Q]	Each sensor for different operation: O ₂ , LEL/UEL, Cl ₂ , CO, H ₂ S, etc. Fan or pump operated. ----- Requires calibration prior to each use. Calibration gases require special transportation. Shelf life dependent on type of sensor. Moderate sensitivity. ICostRating: \$\$ MCostRating: \$ Training: moderate	Handheld. Fan or pump operated. Variable pump speeds. Intrinsically safe. ----- Non-selective. Utilizes different lamps to detect the presence of different substances. Requires calibration prior to each use. Problems at high humidity and low temperatures. Calibration gases require special transportation. Service life dependent on type of lamp. Ionization potential must be considered. ICostRating: \$\$ MCostRating: \$ Training: moderate		

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Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards ¹
CD - Chemical Detection 01 - Portable - <i>Continued</i>			
07CD-01-DPSI Detector, Spectrometry, Ion Mobility, Point, Chemical Agent	Ion mobility spectrometry (IMS) detector for point chemical agent detection. DIQCode: [D,I]	Handheld. Battery operated. Self-testing. Optional wireless remote displays and data logging. Most equipment of this type must be operated at least weekly to maintain calibration and operational effectiveness. See manufacturer's recommendations. Readout indicates relative concentration, not actual measurement. Non-selective. Prone to false positives. Internal radioactive source requires wipe test and NRC licensing. ICostRating: \$\$ MCostRating: \$\$\$ Training: minimal	
07CD-01-DPSW Detector, Surface Acoustic Wave (SAW), Point, Chemical Agent	Surface acoustic wave detector for point chemical agent detection. DIQCode: [D,I]	Handheld. Detects chemical warfare agents. Battery operated. Polymers and acoustic wave components subject to degradation over time. Optional wireless remote displays and data logging. Readout may indicate relative concentration or actual measurement. ICostRating: \$\$ MCostRating: \$ Training: minimal	
07CD-01-INPA Paper, Indicating,	Indicating paper, chemical warfare agent. DIQCode: [D,I]	Handheld. Will specify type/class of chemical warfare agent (G, VX, H). Easy to use. →	

¹ Use numbers given to refer to Standards List at the end of this document.

* Item has been moved or changed in the edition.

Section 7 Detection	Item Number/Title	Description	Features/Operating Considerations	Standards ¹
CD - Chemical Detection				
01 - Portable - <i>Continued</i>	(M-8)		<p>Response time: 30 seconds</p> <p>Liquid agent only.</p> <p>Long shelf life.</p> <p>ICostRating: \$</p> <p>MCostRating: N/A</p> <p>Training: minimal</p> <p>Prone to false positives.</p>	
07CD-01-INTTP	Indicating tape, chemical warfare agent	DIQCode: [D, I]	<p>Will specify type/class of chemical warfare agent (G, VX, H).</p> <p>Easy to use.</p> <p>Response time: 30 seconds</p> <p>Attached to PPE or equipment.</p>	
07CD-01-KCTC	Colorimetric tape/tube/chip kit specific for TICs and WMD applications.	DIQCode: [D,I,Q]	<p>Liquid agent only.</p> <p>Long shelf life.</p> <p>ICostRating: \$</p> <p>MCostRating: N/A</p> <p>Training: minimal</p> <p>Prone to false positives.</p>	78, 83
Kit, Colorimetric Tape/Tube/Chip			<p>Chemical specific.</p> <p>User friendly.</p> <p>Limited shelf life.</p> <p>Wide variance in detection level.</p> <p>Sensitive to humidity and temperature.</p> <p>ICostRating: \$\$</p> <p>MCostRating: \$ →</p>	

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Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards ¹
CD - Chemical Detection 01 - Portable - <i>Continued</i>			
07CD-01-KLSV Kit, Chemical Classifying	Chemical classifying kit for unknown liquids, solids and vapors. DIQCode: [D,J]	Identifies classes of chemicals. Requires constant refresher training, dedicated technician. Time consuming. Subjective results. Reagent shelf life and replacement costs. ICostRating: \$\$ MCostRating: \$ Training: extensive	
07CD-01-KPCB Kit, PCB Test	PCB test kit. DIQCode: [D, I, Q]	Limited shelf life. ICostRating: \$ MCostRating: \$ Training: minimal	
07CD-01-KTHG Kit, Mercury Test/ Mercury Vapor Test	Mercury and mercury vapor test kit. DIQCode: [D,J]	Easy to use. Moderate detection level. ICostRating: \$ MCostRating: \$ Training: minimal	
07CD-01-KWTR Kit, Chemical Agent Water Test	Chemical agent water test kit. DIQCode: [D]	Detects chemical agents in water. Unspecified detection level. ICostRating: \$ →	

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Section 7 Detection		Description	Features/Operating Considerations	Standards ¹
CD - Chemical Detection				
01 - Portable - <i>Continued</i>				
Item Number/Title	Description			
07CD-01-M256 Kit, M-256(A1)	M-256(A1) detection kit for chemical agent (military grade; blister: HD/L; blood: AC/CK; and nerve: GB/VX) detection. DIQCode: [D, I]	Detects nerve, blood and blister agents. Self-contained colorimetric kit. Instructions in case. Response time: 15 -25 minutes Training kit available. ----- Detects presence/absence, not quantity. Vapor only, except G agents. Must be disposed of as hazardous waste after use. Shelf life considerations. ICostRating: \$ MCostRating: \$ Training: minimal	MCostRating: \$ Training: minimal	
07CD-01-MONO Detector, Single Chemical Sensor	Single gas meter with point chemical detection. DIQCode: [D,I,Q]	One gas meter. Different sensor for each operation. Fan or pump operated, some passive. ----- Different sensors for different gases. Shelf life dependent on sensor type. Moderate sensitivity. ICostRating: \$ MCostRating: \$ Training: minimal		

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Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards ¹
CD - Chemical Detection			
01 - Portable - <i>Continued</i>			
07CD-01-PNAA Detector, Pulsed Neutron Activation, Non-Invasive	Chemical detector utilizing pulsed neutrons. Non-destructive detection of CWAs in sealed containers. DIQCode: [D,J]	Detection unit combined with computer library of chemical spectrums. ----- Radiological controlled materials requiring swipe tests and NRC license. NRC radiological controls program is required prior to purchasing this equipment. ICostRating: \$\$\$\$ MCostRating: \$\$\$ Training: extensive	
07CD-01-POLY Detector, Reactive Polymer	Reactive polymer point chemical agent detector. DIQCode: [D,I,Q]	Chemical specific polymers. Discrete ID and quantification. ----- Emerging technology. Requires specific chip for chemical(s) being detected. Some polymers degrade with acids. ICostRating: \$\$ MCostRating: \$\$ Training: minimal	
CD - Chemical Detection			
02 - Lab Equipment			
07CD-02-DPGC Detector, Gas Chromatograph/Mass Spectrometer, Chemical Agent	Gas chromatograph and/or mass spectrometer detector for chemical agent detection (GC and/or MS). DIQCode: [D,I]	Identifies specific chemicals. Response time: 5-15 minutes ----- Climate sensitive. High maintenance and recurring training. Reagents and calibration requirements costly. ICostRating: \$\$\$\$ MCostRating: \$\$ Training: extensive	

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Section 7 Detection		Item Number/Title	Description	Features/Operating Considerations	Standards ¹
CD - Chemical Detection 03 - Fixed-Site Sampling and/or Detection Systems	07CD-03-IRED Detector, Fixed Site, Chemical, Infrared	Chemical detection devices designed to be mounted in buildings or on fixed exterior mounts that utilize infrared detection technologies such as Fourier Transform Infrared (FT-IR), Raman, FT-IR/Raman, or photo-acoustic infrared (PIR) for chemical detection. DIQCode: [D,I]			
CD - Chemical Detection 04 - Standoff Detectors	07CD-04-DCSO Detector, Stand-Off, Chemical	Stand-off chemical detector. FTIR system. DIQCode: [D, I]	Cold zone operations. Detects to 3 km.	Currently available to military only. Sensitive to atmospheric conditions. Gross level detector - does not provide range information. Requires line-of-sight. JCostRating: \$\$\$\$\$ MCostRating: \$\$ Training: extensive	

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Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards ¹
CS - Chemical Support			
01 - Portable			
07CS-01-KAVC Kit, Air/Vapor Chemical Sampling	Air/vapor chemical sampling/evidence kit.	Commercial sample collection kits. ----- ICostRating: \$ MCostRating: \$ Training: minimal	
07CS-01-KLCS Kit, Liquid Chemical Sampling	Liquid chemical sampling/ evidence kit.	Commercial sample collection kits. ----- ICostRating: \$ MCostRating: \$ Training: minimal	
07CS-01-KSCS Kit, Solid Chemical Sampling	Solid chemical sampling/ evidence kit.	Commercial sample collection kits. ----- ICostRating: \$ MCostRating: \$ Training: minimal	
07CS-01-LEAK Detectors, Leak	Leak detectors (e.g., soap solution, ammonium hydroxide, ultrasonic, etc.).	----- ICostRating: \$ MCostRating: \$ Training: minimal	
ED - Explosive Detection			
01 - Portable			
07ED-01-DOGS Canines, Explosive Detecting	Explosive detecting canines, related CBRNE training, protective equipment/garments, handling	Departments should consider and plan for food, kenneling, transportation, and veterinary expenses associated with explosive detecting canines. ----- ICostRating: \$\$ →	

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Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards ¹
ED - Explosive Detection			
01 - Portable - <i>Continued</i>			
07ED-01-SNIF	Handheld air-sampling explosive detectors. DIQCode: [D,I]	and training accessories. DIQCode: [D] Detects particulates and vapors. Some contain radioactive sources. Wipe test required for equipment with radioactive source. False positives and negatives. ICostRating: \$\$ MCostRating: \$\$ Training: moderate	MCostRating: \$\$ Training: extensive
ED - Explosive Detection			
03 - Fixed-Site Sampling and/or Detection Systems			
07ED-03-PORT	Ion mobility spectrometry (IMS) explosives screening equipment. Two types: walk-through and drive-through (vehicle). DIQCode: [D,I]	Walk-through / Vehicle Drive-through portal monitor. Requires frequent calibration and confidence testing. Subject needs to remain in monitor for several seconds. False positives possible. ICostRating: \$\$\$ MCostRating: \$\$ Training: extensive	
07ED-03-SWPE	A cloth item used to wipe a surface, and placed in a machine that analyzes vapor for identifying the explosive. DIQCode: [D,I]	Fixed-facility screening device. Requires presence of particulate matter. Requires regular calibration by trained technician. Swipes may be proprietary to machine. ICostRating: \$\$\$ →	

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Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards ¹
ED - Explosive Detection 03 - Fixed-Site Sampling and/or Detection Systems - <i>Continued</i>			
ED - Explosive Detection 04 - Standoff Detectors		MCostRating: \$\$\$ Training: moderate	
07ED-04-XRAY X-Ray, Explosive Detecting	X-Ray systems for explosive detection. DIQCode: [D,I]		
RD - Radiological Detection 01 - Portable			
07RD-01-DHPG Detector, High-Purity Germanium	High-purity germanium detector. DIQCode: [D,I,Q]	Portable handheld or laboratory fixed. Gamma isotope characterization. ----- Considerable preparation time. Liquid nitrogen coolant may be required. Limited battery life for portable units, consider power source for prolonged operation. Calibration standards required. ICostRating: \$\$\$ MCostRating: \$\$ Training: extensive	70
07RD-01-DOSE Dosimeter, Electronic	Electronic dosimeter (ED). DIQCode: [D,Q]	Auto range (mR to R)/hour (SI Units also available). Small, lightweight. Beta/Gamma/neutron detection. Audible alarm. ----- Limited battery life. →	71

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Section 7 Detection		Item Number/Title	Description	Features/Operating Considerations	Standards ¹
RD - Radiological Detection					
01 - Portable - <i>Continued</i>				Vibralert option. Limited sensitivity. ICostRating: \$ MCostRating: \$ Training: minimal	72, 140
07RD-01-DOSS Dosimeter, Personal	Personal dosimeter; film or thermoluminescence dosimetry (TLD). DIQCode: [D,Q]			Film type detects Gamma, X-Ray, and Neutron. TLD also detects Beta. Records total dose to wearer. Not self-reading. Temperature sensitive. Service costs. ICostRating: \$ MCostRating: \$ Training: minimal	72, 140
07RD-01-DOSS Dosimeter, Self-Reading	Self-reading dosimeter (SRD) or pocket ionization chambers (PIC). DIQCode: [D,Q]			Records total dose to wearer. Detects Gamma only. Shock sensitive. Charging unit [battery operated & non-battery (piezoelectric)]. Difficult to read. ICostRating: \$ MCostRating: \$ Training: minimal	72
07RD-01-HHCM	Handheld contamination meter (alpha/beta, beta/ Various scales (CPM, mR, Sv). →			Multiple probes, mission dependent.	72

¹ Use numbers given to refer to Standards List at the end of this document.

* Item has been moved or changed in the edition.

Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards ¹
RD - Radiological Detection 01 - Portable - <i>Continued</i>			
Meter, Contamination, Handheld	gamma, neutron). DIQCode: [D,I,Q]	Limited battery life. Calibration required. Alpha Mylar face prone to damage. ICostRating: \$ MCostRating: \$ Training: moderate	71
07RD-01-PDGA Detector, Personal Radiation (Gamma and Neutron)	Personal radiation “detector” (gamma and neutron). DIQCode: [D]	Portable. High sensitivity. Response time: quick Detects gamma and/or neutron.	
		Operator must set alarming levels. No self confidence test built in. ICostRating: \$ to \$\$ MCostRating: \$ Training: moderate	
RD - Radiological Detection 02 - Transportable Lab Equipment			
07RD-02-HHSP Spectrometer, Hand-held (NaI or CZT) with Nuclide Identification	Handheld spectrometer (NaI or CZT) with nuclide identification. DIQCode: [I,Q]	Fixed or portable. Spectral analysis. Neutron detection capable.	73
		Calibration required. Library of isotopes or reachback required to ID. Limited battery life. Temperature sensitive. ICostRating: \$\$ →	

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Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards ¹
RD - Radiological Detection			
02 - Transportable Lab Equipment - <i>Continued</i>			
RS - Radiological Support			
01 - Portable			
07RS-01-AFCB	Air flow calibrators for samplers. Personal air sampler. Area air sampler (high volume).	Particulate collector. Fixed or portable. ----- Outside analysis of filter medium: costly ICostRating: \$ to \$\$ MCostRating: \$ Training: moderate	
SE - Support Equipment			
01 - Portable			
07SE-01-IHTS	Heat sensing device. Sensor, Heat, Infrared	Handheld or hands free. High temperature sensitivity. High-quality resolution. ----- Waterproof. Durable. Limited battery life. ICostRating: \$\$ MCostRating: \$ Training: minimal	
07SE-01-THMS	Surface thermometer.	Handheld. Accurate. Precise. →	
Thermometer, Surface			

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Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards ¹
SE - Support Equipment 01 - Portable - <i>Continued</i>		Durable. ICostRating: \$ MCostRating: \$ Training: minimal	
SE - Support Equipment 03 - Fixed-Site Sampling	07SE-03-ENVIS Equipment, Environmental (Weather) Surveillance	Environmental (weather) surveillance equipment to support CBRNE detectors.	Wind speed/direction. Temperature. Humidity. Barometric pressure. Fixed (vehicle mounted) or portable. Information transfer. Software interface. ICostRating: \$\$ MCostRating: \$ Training: minimal

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